Claims Listing

1. (Amended Herein) A system for monitoring defects in a structure, the system comprising:

a power supply for supplying a direct current to a monitoring area of the structure and a reference;

a measurement circuit for measuring a potential drop across at least two contact points of the monitoring area and at least two contact points of the reference; and

a processor having a multi-channel interface for simultaneously receiving potential drops, wherein the processor is adapted to [determine] directly measure the effects of defects in the structure through a determination of a ratio of the monitoring area potential drop to the reference potential drop indicative of a percentage change in a thickness of the structure.

2. (Original) The system as in claim 1, wherein the reference is of a same material as the structure.

3. (Original) The system as in claim 1, wherein the reference is electrically coupled to the structure.

4. (Original) The system as in claim 3, wherein the reference includes a first current injection port for coupling the power supply to the reference and the structure includes a second current injection port for coupling the power supply to the structure, wherein current will flow from the first current injection port to the second current injection port.

5 (Original) The system as in claim 3, wherein the reference includes a plurality of current

injection ports for coupling the power supply to the reference and the structure includes a plurality of current injection ports for coupling the power supply to the structure, wherein a plurality of currents may be applied in different directions across the reference and structure.

6. (Original) The system as in claim 1, wherein the monitoring area includes a plurality of contact points arranged in a matrix for measuring a potential drop across any pair of contact points.

7. (Original) The system as in claim 6, wherein the measuring circuit measures the plurality of contact points simultaneously.

8. (Original) The system as in claim 1, wherein the power supply is a direct current battery.

9. (Amended Previously) The system as in claim 1, further comprising a display for displaying a value of the ratio in an approximate location on the structure.

10. (Original) The system as in claim 1, further comprising a communication module for transferring the measured potential drops and the ratio to other systems.

11. (Amended Herein) A method for monitoring defects in a structure, the method comprising the steps of:

supplying a direct current to a monitoring area of the structure and a reference;

measuring a first potential drop across at least two contact points of the monitoring area while simultaneously measuring a first potential drop across at least two contact points of the

reference;

directly measuring the effects of defects in the structure by determining a ratio of the monitoring area potential drop to the reference potential drop indicative of a percentage change in a thickness of the structure; and

simultaneously communicating each of said first potential drops to a processor to enable the processor to read each of the potential drops simultaneously.

12. (Original) The method of claim 11, wherein the measuring step includes measuring a second potential drop across the at least two contact points of the monitoring area and a second potential drop across the at least two points of the reference with no current supplied.

13. (Original) The method of claim 12, wherein the measuring step includes the steps of:

calculating the monitoring area potential drop by subtracting the first monitoring area potential drop with the second monitoring area potential drop; and

calculating the reference potential drop by subtracting the first reference potential drop with the second reference potential drop.

14. (Original) The method of claim 13, wherein the calculating step includes the steps of:

calculating a corrected monitoring area potential drop by dividing the monitoring area potential drop by an internal voltage drop of a measuring circuit; and

calculating a corrected reference potential drop by dividing the reference area potential drop by the internal voltage drop of the measuring circuit.

15. (Original) The method as in claim 11, wherein the measuring step includes measuring a plurality of potential drops across the at least two contact points and averaging the plurality of potential drops to determine the first monitoring area potential drop.

16. (Original) The method as in claim 11, wherein the monitoring area of the structure includes a plurality of contact points and the measuring step includes measuring a potential drops across the plurality of contact points simultaneously.

17. (Original) The method as in claim 16, further comprising the step of displaying the measured potential drops of the plurality of contact points in relation to a physical location of the structure.

18. (Amended Previously) The method as in claim 11, further comprising the steps of:

supplying the direct current in a plurality of paths sequentially; and

measuring the potential drops across the at least two contact points of the monitoring area for each current path supplied.

19. (Original) The method as in claim 18, further comprising determining a vector corresponding to the measured potential drops, the vector including a magnitude component and a direction component.

20. (Original) The method as in claim 19, further comprising displaying the vector in relation to a physical location of the structure.